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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/728,243	12/04/2003	Duck Young Jung	SUN-0035	7809

23413 7590 11/05/2008

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EXAMINER	
PETERSON, CHRISTOPHER K	
ART UNIT	PAPER NUMBER
2622	

NOTIFICATION DATE	DELIVERY MODE
11/05/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/728,243	JUNG, DUCK YOUNG	
	Examiner	Art Unit	
	CHRISTOPHER K. PETERSON	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 October 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-6,15 and 20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-6,15 and 20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The Amendment After Final Rejection filed on October 20, 2008 has been received and made of record. Examiner notes that the Applicant has added new claims 7 - 20, which include limitations similar to those of claims 1 - 6. Claims 1 - 20 are pending in this application.

Response to Arguments

2. Applicant's arguments, see After Final Arguments, filed October 20, 2008, with respect to the rejection(s) of claim(s) 1 and 4 - 6 under Rotzoll (US Patent 6,806,458) in view of Bock (US Patent 6,707,410) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Martin (US Patent # 6,271,785).

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1 and 4 – 6, 15 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Martin (US Patent # 6,271,785) in view of Rotzoll (US Patent 6,806,458).

As to claim 1, Martin teaches an image sensor having a plurality of pixels, each pixel comprising:

- a photocell (photocell 16) which receives light in response to a shutter control signal (pixel reset 26 and expose 24) and generates an analog signal corresponding to a quantity of the received light (Col. 4, lines 10 - 39). Martin teaches the pixel reset (26) provides a way of canceling offsets to limit the differences, or offsets, among individual comparator circuits (18) and photo detectors (16) within the pixel array (12). The expose signal (24) connects the photo-diode (16) to comparator (18) through transistor M2. Examiner believes the reset signal (26) and expose signal (24) act like a control signal for an electronic shutter system.
- a latch type comparator (18) which compares the analog signal of the photocell (16) to an analog signal from a D/A conversion circuit (30) (Col.3, lines 39 – 56), generates a 1-bit digital signal having a value of the comparison and maintains the 1-bit digital signal generated by the comparison until a subsequent shutter control signal (24 and 26) is received (Col.3, lines 39 – 56); and
- a switch (20) which outputs the 1-bit digital signal of the latch type comparator (18) based on a pixel select signal (Row 1 or Row2) (Col.3, line 57 – Col. 4, line 2).

Martin does not teach a latch type comparator (18) which compares the analog signal of the photocell (16) and an analog signal of a photocell of an

adjacent pixel. Rotzoll (Fig. 6A) teaches a latch type comparator (comparator circuit 1300 A-D) which compares the analog signal of the photocell (Vout (t)) and an analog signal of a photocell of an adjacent pixel (Vr1 (pixel on the right) or Vu1 (pixel on top)) and generates a digital signal having a value of the compared result (Ex- and Ey-) (Col. 9, lines 28 – 42). In figure 7, Rotzoll shows the latch type comparator (1300) in greater detail. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a latch type comparator which compares the analog signal of the photocell and an analog signal of a photocell of an adjacent pixel as taught by Rotzoll to the image sensor of Martin, because by comparing light intensity between the first and second pixels an edge condition can be determined between the first and second pixels and reduce power consumption and circuit complexity (Col. 5, lines 4 – 58).

As to claim 4, Rotzoll wherein the analog signal (Vout (t)) of the photocell (1000 and 1100) of the adjacent pixel (Vr1 (pixel on the right) or Vu1 (pixel on top)) is a reference voltage (Col. 9, lines 28 – 42).

As to claim 5, Rotzoll teaches wherein the photocell (1000 and 1100) is a photo diode (1000) that generates a photocurrent corresponding to the received quantity of light (Col. 8, lines 57 – 65).

As to claim 6, Rotzoll teaches wherein the latch type comparator (1300 A-D) outputs (Ex- and Ey-) a first signal when the analog signal (Vout (t)) of the photocell (1000 and 1100) is greater than the analog signal (Vr1 or Vu1) of the photocell (1000 and 1100) of the adjacent pixel (pixel on the right or pixel on top)

and outputs a second signal when the analog signal (Vout (t)) of the photocell (1000 and 1100) is less than the analog signal (Vr1 or Vu1) of the photocell (1000 and 1100) of the adjacent pixel (pixel on the right or pixel on top) (Col. 9, lines 28 – 42). It is well known in the art that a comparator acts like an analog to digital converter; therefore the output (Ex- and Ey-) would either be high or low giving two different outputs.

As to claim 15, Martin teaches an optical pointing system comprising:

a) a plurality of pixels, each comprising

- a photocell (photocell 16) which receives light in response to a shutter control signal (pixel reset 26 and expose 24) and generates an analog signal corresponding to a quantity of the received light (Col. 4, lines 10 - 39). Martin teaches the pixel reset (26) provides a way of canceling offsets to limit the differences, or offsets, among individual comparator circuits (18) and photo detectors (16) within the pixel array (12). The expose signal (24) connects the photo-diode (16) to comparator (18) through transistor M2. Examiner believes the reset signal (26) and expose signal (24) act like a control signal for an electronic shutter system.
- a latch type comparator (18) which compares the analog signal of the photocell (16) to an analog signal from a D/A conversion circuit (30) (Col.3, lines 39 – 56), generates a 1-bit digital signal having a value of the comparison and maintains the 1-bit digital signal

generated by the comparison until a subsequent shutter control signal (24 and 26) is received (Col.3, lines 39 – 56); and

- a switch (20) which outputs the 1-bit digital signal of the latch type comparator (18) based on a pixel select signal (Row 1 or Row2) (Col.3, line 57 – Col. 4, line 2).

Martin does not teach a latch type comparator (18) which compares the analog signal of the photocell (16) and an analog signal of a photocell of an adjacent pixel. Rotzoll (Fig. 6A) teaches a latch type comparator (comparator circuit 1300 A-D) which compares the analog signal of the photocell (Vout (t)) and an analog signal of a photocell of an adjacent pixel (Vr1 (pixel on the right) or Vu1 (pixel on top)) and generates a digital signal having a value of the compared result (Ex- and Ey-) (Col. 9, lines 28 – 42). In figure 7, Rotzoll shows the latch type comparator (1300) in greater detail. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a latch type comparator which compares the analog signal of the photocell and an analog signal of a photocell of an adjacent pixel as taught by Rotzoll to the image sensor of Martin, because by comparing light intensity between the first and second pixels an edge condition can be determined between the first and second pixels and reduce power consumption and circuit complexity (Col. 5, lines 4 – 58).

b) Rotzoll teaches an image processor (processing means 400) which calculates a movement value using the digital signals outputted from the plurality of pixels and generates a pixel select signal and a shutter control (Col. 8, lines 13

– 21). Rotzoll teaches the use of a processing means to calculate a movement value. Martin teaches a pixel select signal (Row1) and a shutter control (24 and 26) (Col. 4, lines 10 - 39) (Col.3, line 57 – Col. 4, line 2). Note the discussion above concerning the pixel select signal and a shutter control signals of Martin.

c) Martin teaches a shutter control circuit (control logic 102) which generates at least one of the shutter control signal (24 and 26) and the second subsequent shutter control signal (24 and 26) based on the shutter control information signal of the image processor (external processing systems) (Col. 5, lines 22 – 43).

As to claim 20, Martin teaches an optical pointing system comprising:

a) a plurality of pixels, each comprising

- a photocell (photocell 16) which receives light in response to a shutter control signal (pixel reset 26 and expose 24) and generates an analog signal corresponding to a quantity of the received light (Col. 4, lines 10 - 39). Martin teaches the pixel reset (26) provides a way of canceling offsets to limit the differences, or offsets, among individual comparator circuits (18) and photo detectors (16) within the pixel array (12). The expose signal (24) connects the photo-diode (16) to comparator (18) through transistor M2. Examiner believes the reset signal (26) and expose signal (24) act like a control signal for an electronic shutter system.
- a latch type comparator (18) which compares the analog signal of the photocell (16) to an analog signal from a D/A conversion circuit

(30) (Col.3, lines 39 – 56), generates a 1-bit digital signal having a value of the comparison and maintains the 1-bit digital signal generated by the comparison until a subsequent shutter control signal (24 and 26) is received (Col.3, lines 39 – 56); and

- a switch (20) which outputs the 1-bit digital signal of the latch type comparator (18) based on a pixel select signal (Row 1 or Row2) (Col.3, line 57 – Col. 4, line 2).

Martin does not teach a latch type comparator (18) which compares the analog signal of the photocell (16) and an analog signal of a photocell of an adjacent pixel. Rotzoll (Fig. 6A) teaches a latch type comparator (comparator circuit 1300 A-D) which compares the analog signal of the photocell (Vout (t)) and an analog signal of a photocell of an adjacent pixel (Vr1 (pixel on the right) or Vu1(pixel on top)) and generates a digital signal having a value of the compared result (Ex- and Ey-) (Col. 9, lines 28 – 42). In figure 7, Rotzoll shows the latch type comparator (1300) in greater detail. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a latch type comparator which compares the analog signal of the photocell and an analog signal of a photocell of an adjacent pixel as taught by Rotzoll to the image sensor of Martin, because by comparing light intensity between the first and second pixels an edge condition can be determined between the first and second pixels and reduce power consumption and circuit complexity (Col. 5, lines 4 – 58).

b) Rotzoll teaches an image processor (processing means 400) which calculates a movement value using the digital signals outputted from the plurality of pixels and generates a pixel select signal and a shutter control (Col. 8, lines 13 – 21). Rotzoll teaches the use of a processing means to calculate a movement value. Martin teaches a pixel select signal (Row1) and a shutter control (24 and 26) (Col. 4, lines 10 - 39) (Col.3, line 57 – Col. 4, line 2). Note the discussion above concerning the pixel select signal and a shutter control signals of Martin.

c) Martin teaches a shutter control circuit (control logic 102) which generates at least one of the shutter control signal (24 and 26) and the second subsequent shutter control signal (24 and 26) based on the shutter control information signal of the image processor (external processing systems) wherein the at least one of the shutter control signal and the subsequent shutter control signal comprises a first signal based on a period in which the shutter is turned on and a second signal based on an initial operation of the image processor (Col. 5, lines 22 – 43). Martin teaches the various other functions of the imager chip 100 may be controlled via the control lines 106 depending on the application in which the chip 100 is used (Col. 5, lines 51 – 54). Martin teaches the external processing circuit may change the expose time cycle and the frequency of the clock. The examiner believes the external processing system may change the shutter control information signal by making changes to the control lines (106).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTOPHER K. PETERSON whose telephone number is (571)270-1704. The examiner can normally be reached on Monday - Friday 6:30 - 4:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, NgocYen Vu can be reached on 571-272-7320. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/C. K. P./
Examiner, Art Unit 2622
27 October 2008

/Ngoc-Yen T. VU/
Supervisory Patent Examiner, Art Unit 2622